
# DoD Independent Research & Development

# Program Report

**May 2002**

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## 1.0 Introduction

The Department of Defense (DoD) Independent Research and Development (IR&D) Program provides guidance and oversight for DoD implementation of IR&D law and regulations, promotes communications between DoD and industry about IR&D issues, and promotes effective use of IR&D accomplishments by DoD. This report summarizes IR&D Program actions from November 2000[1] to March 2002.

"Independent Research and Development" is R&D initiated and conducted by defense contractors independent of DoD control and without direct DoD funding.[2] Major defense contractors[3] conduct thousands of IR&D projects currently costing approximately $3 billion annually. These projects provide an important supplement to R&D funded directly by DoD. Contractors recovered 51 percent of IR&D costs as indirect expenses under defense contracts in Fiscal Year 2000 (FY00).

Defense contractors and DoD play complementary roles with respect to IR&D activities. Primary control of these activities rests with the contractors, who are free to determine both the amount and focus of their IR&D activities. However, contractors are motivated to focus on technical areas of interest to DoD, both to strengthen their competitive positions in the defense market and to maximize the amount of IR&D costs eligible for recovery under defense contracts.

While contractors have not been required to report IR&D plans and accomplishments to DoD (see Sec 2.5), they do so to advertise their technical capabilities to potential DoD customers. Most major contractors provide information to DoD about their IR&D activities through technical interchange meetings (TIMs) with DoD representatives and IR&D project descriptions submitted to the Defense Technical Information Center (DTIC) for inclusion in the IR&D Database. Spending on IR&D projects covered by summaries submitted to DTIC in 2001 totaled nearly $2.7 billion, up from $2.2 billion for projects submitted in 2000.

DoD influences IR&D decisionmaking by providing contractors with information about DoD-funded R&D and defense technological needs and with feedback about the applicability of IR&D accomplishments to defense needs. The R&D and technological needs information is made available to contractors in DoD reports and planning documents. A number of these documents can be accessed over the Internet.[4] DoD also participates in technical meetings and conferences with industry to exchange information about R&D activities and to convey information about defense technological needs.

DoD plays an important role in facilitating the transition of IR&D accomplishments for use in defense applications. DoD reviews IR&D projects to identify new products and services to be developed further and to be acquired for defense purposes. In addition, it is DoD policy to review contractor IR&D summary reports prior to initiating DoD R&D to avoid duplication by DoD-funded efforts.

## 1.1 DoD IR&D Program

The primary objectives of the DoD IR&D Program are to ensure that: (1) industry is aware of DoD's R&D activities and technological needs; (2) industry provides information to DoD about their IR&D activities; and (3) DoD makes effective use of IR&D accomplishments in defense applications.

Lead responsibility for the IR&D Program rests with the Technical Coordination Group (TCG), under the cognizance of the Director, Defense Research and Engineering (DDR&E). The TCG is chaired by a senior Science and Technology (S&T) manager from the Office of the DDR&E and includes a senior S&T manager from each Military Department. Industry representatives also participate in TCG meetings to provide information for the IR&D Program. The TCG is responsible for establishing IR&D policy and implementing and overseeing IR&D Program actions. It also provides policy authority to DoD organizations for disseminating DoD technical and programmatic information to contractors to assist these contractors in conducting effective IR&D efforts.

The TCG is supported by the IR&D Working Group. The Working Group is chaired by the DoD IR&D Program Manager and includes the IR&D Program Manager for each Military Department, the Program Manager for the IR&D Database maintained by DTIC, and a representative of the Director of Defense Procurement.

The IR&D-related responsibilities of DoD organizations are spelled out in DoD Directive 3204.1, Independent Research and Development (IR&D) and Bid and Proposal (B&P) Program.[5] A summary of these responsibilities follows:

- DDR&E is responsible for issuing policy and guidance for all DoD activities on the technological aspects of IR&D, encouraging contractors to report IR&D activities to DoD, and ensuring that DoD technological needs and priorities are communicated to contractors.
- The Director of Defense Procurement is responsible for policy, guidance, and oversight for all DoD activities on the procurement and business aspects of IR&D.
- The Secretary of each Military Department is responsible for ensuring technical interaction with contractors to explain Government interests and needs and to develop an understanding of the achievements of contractor IR&D.
- The Heads of DoD Components are responsible for ensuring that their staffs who plan and introduce new in-house and contract R&D projects search the IR&D Database to determine whether the proposed work duplicates IR&D efforts.

DTIC collects and maintains thousands of IR&D project summaries submitted by defense contractors in a restricted-access database. The IR&D Database can be accessed by registered DoD users over the Internet through the Secure STINET service and is used to identify technological capabilities applicable to defense needs and to avoid duplication of contractor IR&D activities by R&D funded directly by DoD.

## 1.2 IR&D Policy

IR&D policy is spelled out in DoD Directive 3204.1. Key elements of this policy include:

- Contractors shall be encouraged to undertake IR&D activities that may further national security in a broad sense, may lead to a superior military capability, or may lower the cost and time required for providing that capability.
- Costs incurred by defense contractors for IR&D activities are recognized by DoD as necessary costs of doing business, particularly in a high-technology environment. IR&D costs incurred in performing activities of potential interest shall be reimbursable as indirect expenses under "covered" contracts[6] to the extent that they are allocable, reasonable, and not otherwise unallowable by law.
- DoD shall seek to enhance the efficiency and productivity of DoD R&D, and DoD contract R&D, by considering the work and accomplishments of contractor IR&D programs when planning, programming, and budgeting for DoD R&D.
- DoD shall enhance its knowledge of contractor IR&D by reviewing summary reports of contractor IR&D efforts.
- DoD shall enhance the efficiency and productivity of contractor IR&D activities by providing to contractors available information useful to their planning and research in bounds set by security, intellectual property rights, fairness in competition, and good business practice. Information to be provided includes the R&D plans, descriptions of both in-house and funded research, mission needs, and operational requirements.

## 1.3 IR&D Program Action Plan

The IR&D Program Action Plan was developed to improve the processes within DoD for managing IR&D activities and to increase the effectiveness of IR&D spending to support national defense needs. The Plan focuses on improving communications between DoD and industry on defense needs and IR&D accomplishments and ensuring effective use of IR&D accomplishments to meet defense needs.

The Plan is the product of a series of meetings of the IR&D Technical Coordination Group and the IR&D Working Group in which IR&D issues were examined and actions were identified to encourage IR&D in areas of importance to national defense and to promote awareness of IR&D activities within DoD and the U.S. industrial base. The Plan was approved in November 2000 by the Deputy Under Secretary of Defense (Science & Technology). Implementation of the Plan is a shared responsibility of the Office of the Secretary of Defense (OSD), the Services, and the Defense Technical Information Center. Industry also contributes through participation in TCG meetings.

The Action Plan focuses on four objectives:

(1) To improve IR&D Program policy, management, and planning;
(2) To promote effective DoD use of technologies developed through IR&D efforts;

(3) To improve Government/industry communications on DoD's S&T goals and IR&D projects; and
(4) To evaluate other measures to increase the effectiveness of IR&D efforts.

The following sections of this report address these objectives in order, summarizing IR&D Program actions to achieve each objective.

## 2.0 IR&D Program Policy, Management, and Planning

The IR&D Program has no role in the direct management of IR&D activities. IR&D activities are, by definition, managed by industry. The focus of IR&D Program policy, management, and planning is on increasing industry awareness of defense technological needs and ensuring effective use of IR&D accomplishments for defense purposes. The Action Plan calls for five actions to improve IR&D Program policy, management, and planning:

- Develop and implement a management and planning process that increases the effectiveness of the IR&D Program;
- Determine how IR&D activities should be integrated into program planning and actions by the DoD Science and Technology community, and recommend actions to achieve such integration;
- Prepare, update, and distribute information describing the IR&D Program and achievements;
- Educate DoD decisionmakers about the fundamental characteristics of IR&D efforts, including restrictions, requirements, and incentives, and how these factor into industry's IR&D decisionmaking; and
- Encourage increased funding for the Services to manage the IR&D Program.

Activities in each of these areas since November 2000 are described in this section.

### 2.1 Management and Planning Process

The IR&D Program management and planning process centers on meetings of the Technical Coordination Group and the IR&D Working Group and on policy and procedures documents that govern Program activities.

**2.1.1 Technical Coordination Group –** The TCG has met three times since November 2000 to guide, review, and approve activities of the IR&D Working Group to implement the Action Plan. Quarterly meetings of the TCG are planned for the future. Industry representatives participate in the TCG meetings to provide industry perspectives on IR&D Program policies, procedures, and actions.

**2.1.2 IR&D Working Group –** The Working Group is the driving force behind implementation of the Action Plan. Primary and supporting responsibilities for actions under the Plan have been allocated among the Working Group members. After the Plan was approved for implementation in November 2000, the Working Group instituted monthly meetings to coordinate IR&D Program activities and to ensure continuing progress in efforts to strengthen the IR&D Program.

**2.1.3 Policy and Procedures Documents –** Policy and procedures governing IR&D Program activities are spelled out in several documents:

- DoD Directive 3204.1, "Independent Research and Development (IR&D) and Bid and Proposal (B&P) Program," May 10, 1999

- Section 2372 of title 10, United States Code, "Independent research and development and bid and proposal costs: payments to contractors"
- Federal Acquisition Regulation (FAR), Subpart 31.205-18, "Independent Research and Development and Bid and Proposal Costs," February 9, 1998
- Defense FAR Supplement, Subpart 231.205-18, "Independent Research and Development and Bid and Proposal Costs," February 23, 1999; and Subpart 242.771, "Independent Research and Development/Bid and Proposal," February 23, 1999.

Each of these documents was reviewed during FY01 and found to be current. No changes were recommended.

**2.1.4 IR&D Program Action Plan –** The management plan currently guiding DoD IR&D Program activities was finalized in October 2000 and approved by the TCG and the Deputy Under Secretary of Defense (S&T) in November 2000.

## 2.2 Integrating IR&D Accomplishments into DoD S&T Planning

It is DoD policy to enhance the efficiency and productivity of DoD R&D, and DoD contract R&D, by considering the work and accomplishments of contractor IR&D programs when planning, programming, and budgeting for DoD R&D. Identifying ways to integrate IR&D activities into S&T program planning and actions strengthens implementation of this policy. The Working Group is currently reviewing regulations, instructions, and directives to identify "formal" procedures for achieving this integration and plans interviews with S&T managers within DoD to gain a better understanding of current efforts to integrate IR&D information into S&T planning, programming, and budgeting. These interviews will be used to identify lessons learned and best practices for integration of IR&D into the activities of the DoD S&T community.

## 2.3 IR&D Program Information

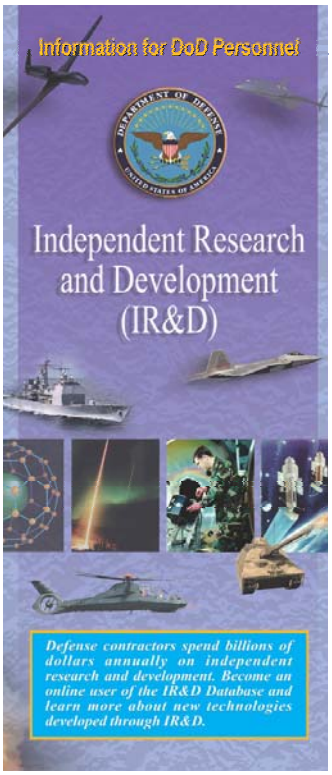
A primary purpose of the IR&D Program is to promote communications relating to IR&D activities. These communications include: (1) information from DoD to industry about defense mission needs and operational requirements, DoD-sponsored R&D plans and activities, and feedback about potential DoD uses for IR&D accomplishments; and (2) information from industry to DoD about IR&D plans and accomplishments. The IR&D Program also promotes education of the DoD community about IR&D accomplishments and about the benefits and requirements relating to DoD awareness and use of these accomplishments.

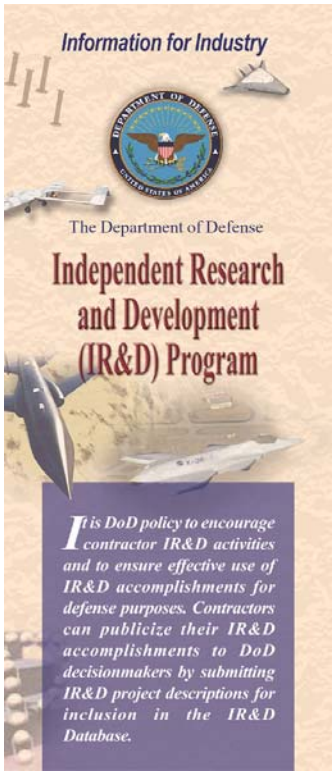
During the past year, the IR&D Program developed outreach materials for a variety of applications:

- Two brochures were created: (1) one for industry to promote an understanding of how IR&D benefits industry and to encourage defense contractors to submit IR&D project descriptions to DoD for inclusion in the IR&D Database; and (2) the other for DoD personnel to raise awareness within DoD about IR&D accomplishments that can be used to meet defense needs and to educate these personnel about their responsibility to avoid

duplication of IR&D activities when initiating DoD-sponsored R&D. (The contents of the two brochures are provided in Appendices C and D.)

**IR&D Program Brochures**




- A poster display that provides highlights about IR&D and the DoD IR&D Program was created for use at conferences and other venues that attract DoD and industry representatives with potential interest in IR&D-related information.
- The DoD IR&D Program website, http://www.dtic.mil/ird/, was redesigned and upgraded to provide easier access to IR&D-related information, including information about: (1) the DoD IR&D Program; (2) IR&D law, regulations, and policy; (3) the database of IR&D project summaries; (4) publications covering IR&D issues; (5) summaries of IR&D spending; (6) sources of information about DoD-sponsored R&D and DoD technological needs; (7) meetings and conferences on technological subjects of interest to the defense community; and (8) IR&D Program points of contact within DoD.
- Briefing materials were prepared for use in various forums, such as defense systems management courses and Government/industry conferences, to educate Government and industry about IR&D issues.

## 2.4 Educating DoD About IR&D

Outreach efforts have been increased to educate DoD personnel about IR&D accomplishments and about requirements to consider these accomplishments in DoD S&T planning. To raise basic awareness of IR&D, the brochure for DoD personnel (see App D) is being distributed to DoD organizations and at technical meetings and conferences. In addition to providing highlights about IR&D issues, the brochure identifies the IR&D Program website as a source of more comprehensive information. The IR&D Program is also working with DoD schools, such as the Defense Acquisition University/Defense Systems Management College, to ensure IR&D issues are covered in relevant courses. Also, a Web-based survey of DoD personnel was initiated to assess awareness of IR&D issues within DoD and to help develop additional strategies to ensure efficient and effective use of IR&D information throughout DoD. (Analysis of the results of this survey was ongoing when this report was written. These results will be provided in future TCG & IR&D WG products.)

DTIC conducted extensive outreach efforts within the DoD community to promote awareness and use of the IR&D database. These efforts targeted existing and potential users of the IR&D database within the DoD S&T community and involved presentations at numerous meetings with, and events attended by, DoD personnel. Information was provided about Internet access to the database (a relatively new DTIC service) and registration procedures for gaining access to the database via DTIC's Secure STINET system. Currently, more than 1,100 DoD personnel are registered to use this DTIC system. The impact of the outreach efforts is reflected in the fact that average weekly use of the Database has increased by more than 75 percent from FY01 to FY02 (year to date). User queries return approximately 1,500 IR&D project summaries of potential interest to these users per week.

## 2.5 Funding for IR&D Program Activities

The changes in IR&D law in the early 1990s caused a sea change in DoD monitoring of IR&D plans and projects. Prior to these changes, major defense contractors were required to submit IR&D plans for DoD review and approval, and ceilings were established on the amount of IR&D costs each contractor could recover as indirect expenses under defense contracts. The current IR&D law, enacted in 1991, phased out the DoD approval requirement and the reimbursement ceilings. While applauding these changes, contractors have expressed concerns about decreased feedback on their IR&D activities. To address these concerns, the DoD IR&D Action Plan, approved by the Technical Coordinating Group and issued by the Deputy Under Secretary of Defense for Science and Technology, encouraged increased funding for Government review of IR&D technical achievements and feedback to industry on IR&D activities.

## 3.0 DoD Use of IR&D Accomplishments

The thousands of IR&D projects conducted annually by defense contractors create a wealth of information about new and improved technologies available to be mined for defense applications. IR&D investment is partially recovered as an indirect expense by the DoD R&D budget, but IR&D activities are generally less visible than DoD-funded R&D efforts to potential DoD users. The second objective of the IR&D Program Action Plan is to raise the visibility of IR&D accomplishments within the defense community and to promote effective DoD use of technologies developed through IR&D efforts. The six actions to achieve this objective are:

- Determine how to maximize effective use of IR&D investments in the acquisition of defense systems;
- Implement actions to ensure effective use of existing IR&D technologies by DoD;
- Identify and implement actions to improve continuously the DTIC IR&D database in terms of content and accessibility;
- Encourage increased funding for Government review of IR&D technical achievements and feedback to industry on IR&D activities;
- Evaluate how IR&D data might best be used by various DoD organizations; and
- Develop methods to encourage increased IR&D investments in high-priority technologies.

This section summarizes efforts in these areas from November 2000 to March 2002.

### 3.1 Effective Use of IR&D Accomplishments

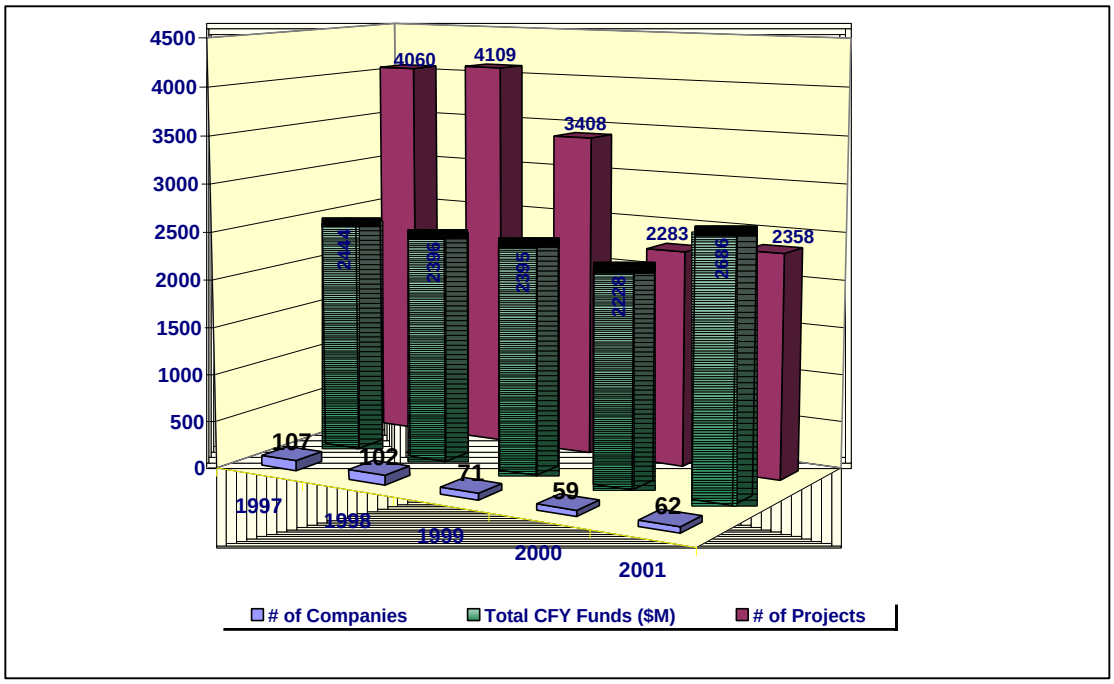
It is DoD policy to enhance its knowledge of contractor IR&D by reviewing summary reports of contractor IR&D efforts. This policy is intended both to strengthen DoD-backed R&D efforts and to facilitate transition of IR&D technologies into defense systems. The latter is the focus of the Working Group efforts to promote effective use of IR&D in defense acquisition. Ongoing efforts to educate DoD personnel about IR&D policy and IR&D information sources support this purpose. (See the discussion of DoD education efforts in section 2.) In addition, the Working Group is currently conducting a Web-based survey of DoD Components to assess awareness of IR&D activities within DoD. The survey findings will be used to develop and modify outreach activities to promote awareness and use of IR&D accomplishments by defense organizations.

### 3.2 Database of IR&D Project Summaries

Efforts to upgrade the DTIC IR&D database with respect to both content and accessibility are ongoing, but considerable improvements have already been achieved. The database became accessible to registered users via the Internet in early 2000. As noted in the section 2, outreach efforts have been increased to raise awareness and use of this new DTIC service. Also, during FY01, enhancements were made to “look and feel” characteristics, query capabilities, and other user-oriented functionality of the database. Upgrades occurred “behind the scenes,” as well, with new hardware, upgraded software, and greatly increased security provisions to protect the business proprietary data maintained in the database from unauthorized access.

To enhance database content, DTIC is conducting outreach efforts to encourage defense contractor submissions to the database. These efforts include onsite visits to new, existing, and potential contributors to the IR&D database and presentations at meetings and conferences attended by industry representatives. The focus of these efforts is on raising awareness of the database and educating industry about how the IR&D database provides industry with an opportunity to "market" their technological capabilities to a wide DoD audience. These efforts resulted in increased submissions to the Database in 2001.

**Submissions of IR&D Project Descriptions to DTIC**




Outreach efforts concerning the IR&D database also involve increased use of the Internet to raise awareness of the Database. DTIC has placed the IR&D Contributor's Guide online, along with additional general information about the Database. The IR&D Program website hosted by DTIC has also been redesigned and the content of this website has been greatly expanded.

### 3.3 DoD Review of IR&D Activities

As noted above, industry has expressed an interest in having DoD provide more feedback regarding their IR&D activities. Review of IR&D technical achievements and feedback to industry about their IR&D activities promotes effective communications to address defense technological needs and IR&D efforts undertaken to meet those needs. Conferences, technical interchange meetings, R&D integrated process teams, and review of project summaries in the IR&D database are methods being used to foster DoD/industry interaction.

### 3.4 IR&D Investment in High-Priority Technologies

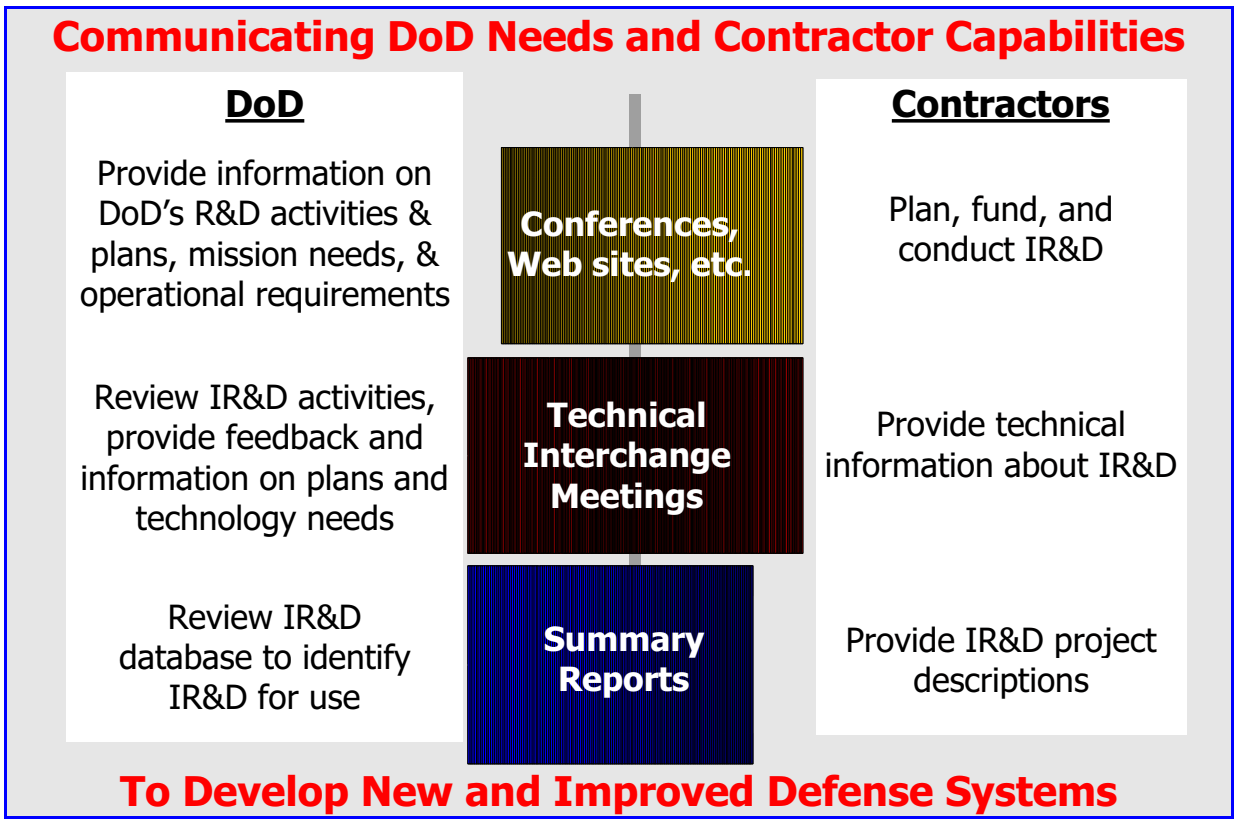
The purpose of this action is to encourage IR&D investments in technologies of greatest importance for defense purposes. This action was stimulated, in part, by a Defense Science Board Task Force study that found that innovative R&D by the defense sector was in decline. The Task Force expressed concern that reduced IR&D spending by defense contractors and a shift in IR&D spending from long-term research to near-term development could undermine efforts to achieve future S&T objectives.

In assessing what might constitute "high-priority" technologies, the Working Group found that defense technological needs span a broad spectrum. For example, the Defense S&T Plan identifies more than 400 Defense Technology Objectives. This and other DoD documents provide a long shopping list of defense technological needs. Rather than focus on "high-priority" needs, per se, the Working Group has focused on methods to encourage IR&D investments with potential applications to the broad spectrum of defense needs. These methods include: facilitating the flow of information to industry about defense R&D and technological needs; providing increased feedback to industry about defense applications for their IR&D accomplishments; and promoting the transition of IR&D accomplishments to defense applications.

As described in other sections of this report, efforts are already underway to facilitate online access to DoD S&T planning and needs documents and to promote DoD/industry meetings and conferences to exchange information about R&D activities and potential defense applications. In addition, the Working Group is exploring Web-based processes for conducting systematic reviews of IR&D project summaries submitted to DoD, providing feedback to the submitters, and notifying DoD organizations of IR&D accomplishments of potential relevance to their missions.

## 4.0 Government/Industry Communications

Promoting better communications between DoD and industry about defense R&D and technological needs and IR&D that might address these needs is a central function of the DoD IR&D Program. Types of communications between DoD and industry concerning defense technological needs and IR&D activities are summarized in the following figure:




The Action Plan includes four actions to improve IR&D-related communications between DoD and industry:

- Facilitate Internet access to information needed by industry for IR&D investment decisions;
- Promote Government-industry and Government-Government meetings and conferences to exchange information on IR&D activities, plans and objectives for Government-funded R&D, ongoing Government R&D, and DoD's technological needs;
- Increase industry reporting on IR&D (and commercial R&D); and
- Develop and implement a process for providing feedback to industry regarding IR&D activities.

This section describes activities of the IR&D Program in each of these areas from November 2000 to March 2002.

### 4.1 Internet Access to DoD Technological Needs Information

Websites are becoming an increasingly important means of communications for the IR&D Program. Industry can access information about DoD's R&D plans and activities and about DoD's mission needs and operational requirements at various sites (some with restricted access) sponsored by OSD, the Military Departments, and other DoD Components. The number of sites and volume of information pose a challenge to any company wishing to identify defense R&D activities and technological requirements that correspond to the company's capabilities. The IR&D Program is simplifying the process of identifying and searching defense S&T and needs information by providing descriptions of available information and links to websites at the IR&D Program website – http://www.dtic.mil/ird/ .

### 4.2 Technical Interchange Meetings and Conferences

This action involved efforts to promote Government-industry and Government-Government meetings and conferences to exchange information on IR&D activities, plans, and objectives for Government-funded R&D, ongoing Government R&D, and DoD's technological needs. The IPT established to address funding for Government review of IR&D technical achievements and feedback to industry about IR&D activities addressed issues involving TIMs and technical conferences, as well. The IPT's recommendations concerning efforts to promote technical meetings and conferences are currently being reviewed by the IR&D Working Group and the TCG for possible implementation during FY02.

### 4.3 Industry Reporting on IR&D Activities

As noted in the previous section, DTIC has dedicated considerable effort to increase industry submissions of IR&D project descriptions for inclusion in the IR&D database. DTIC representatives attend trade shows, meet with defense contractors at their facilities, and make presentations at DTIC and other DoD-sponsored events. These efforts encourage previous contributors to submit updated information about IR&D activities and additional companies to submit IR&D information for the first time. The number of contributors to the Database increased from 59 in 2000 to 62 in 2001; the number of project descriptions increased from 2,283 in 2000 to 2,358 in 2001; and the dollar value of project described increased from $2.2 billion in 2000 to $2.7 billion in 2001.

### 4.4 Feedback to Industry

Currently, the primary means of providing feedback to industry about their IR&D activities is technical interchange meetings. Virtually no substantive feedback is provided with respect to project summaries submitted for inclusion in the IR&D Database. The Working Group is considering several options to provide feedback to industry regarding these project summaries. These options include: (1) publishing statistics about Database usage by DoD – statistics such as number of DoD users per week and number of records returned by user queries per week; (2) notifying companies about which of their project descriptions have been accessed; (3) providing a link to enable Database users to contact company POCs via email; and (4) establishing a Web-based network of experts within DoD to provide feedback on projects in their areas of expertise.

## 5.0 Other IR&D Program Actions

DoD policy recognizes the importance of IR&D activities to both defense contractors and DoD. The fourth objective of the IR&D Program Action Plan is to develop a better understanding of the benefits of IR&D activities. The actions to evaluate the effectiveness of IR&D activities are:

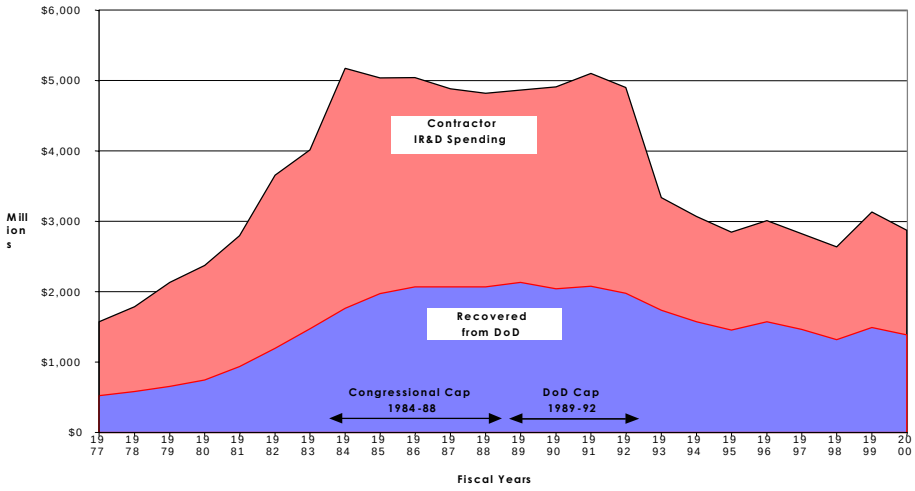
- Produce an annual report that quantifies IR&D investments;
- Develop IR&D "success" and "failure" case studies to promote understanding of the IR&D Program.

In addition to describing activities of the IR&D Program in each of these areas, this section summarizes activities of each Military Department's IR&D Program during FY01.

### 5.1 Annual Report of IR&D Costs

IR&D cost data are compiled and reported annually by the Defense Contract Audit Agency (DCAA). The report includes all major defense contractors that meet either statutory or regulatory dollar thresholds or DCAA reporting criteria. (Periodic increases in the dollar thresholds and DCAA reporting criteria have reduced the number of contractors included in the report over time.) The DCAA summary reports on IR&D costs incurred by major defense contractors for the years 1984 through 2000 are available at http://www.acq.osd.mil/dp/cpf/. IR&D spending by major defense contractors currently averages $3 billion per year. Approximately half of IR&D costs are currently recovered by these contractors as indirect expenses under defense contracts. IR&D spending and costs recovered under defense contracts from 1977 through 2000 are presented in the chart below.

CHART 1
INDEPENDENT RESEARCH AND DEVELOPMENT (IR&D) COSTS
FOR MAJOR DEFENSE CONTRACTORS
FISCAL YEARS 1977 - 2000




**Notes for Chart 1**:
FY 1984-1992: The Congress and DoD imposed caps limiting the total maximum amount of IR&D/B&P ceilings DoD was permitted to negotiate with major defense contractors. FY 1993: The significant decrease in reported dollars is primarily due to a change in the DFARS definition of major contractor to comply with Section 802 of Public Law 102-190, and a change in DCAA reporting criteria.

## 5.2 IR&D Case Studies

While the importance of IR&D activities to both industry and DoD is understood in a general sense, little has been done to document specific benefits. The purpose of this action is to develop case studies of IR&D "successes" and "failures" to gain a better understanding of how IR&D policies and IR&D Program actions affect IR&D activities and DoD use of IR&D accomplishments. Benefits resulting from IR&D can be measured in such areas as: technological competitiveness of U.S. industry; relative performance of U.S. defense systems; business revenues and profits; and defense system costs. Benefits resulting from IR&D Program activities can be measured in such terms as: responsiveness of IR&D activities to defense technological needs and transition of IR&D accomplishments to defense applications.

The **HG1700 Inertial Measurement Unit (IMU)**, used in guidance of smart munitions and unmanned aerial vehicles, demonstrates the benefits of IR&D to both contractors and DoD. In the early 1990s, a defense contractor invested $10 million in an IR&D project to develop an improved and lower-cost IMU for use in expendable defense systems. DoD now buys the resulting IMU for less than one third the unit cost of its predecessor and has incorporated this improved IMU in more than two-dozen systems. The reduced cost and improved capabilities have enabled a substantial increase in the use of these IMUs for precision bombing and other guidance applications. Annual unit sales by the contractor have increased by more than 10-fold and are still growing. Annual revenues from sales of this IMU now total approximately $100 million.

An IR&D project involving **Pressure Sensitive Paint (PSP)** technology demonstrates the benefits to contractors and DoD of the IR&D Database maintained by DTIC. Responding to a need to reduce aircraft development time, a search of the Database by the Air Force IR&D Program identified a PSP technology. Acquisition of this technology enabled the Air Force's Arnold Engineering Development Center (AEDC) to avoid a multimillion-dollar R&D effort to develop a comparable technology. Continuing use of this technology by the AEDC saves $1-2 million and up to six months of wind tunnel time in tests of each new aircraft model. Air Force use of this technology has also provided the contractor with wind tunnel data on their PSP technology.

## 5.3 Service IR&D Programs

**5.3.1 Air Force IR&D Program** – The Air Force (AF) IR&D Program Office helps communicate the Air Force's technological needs to industry, academia, and government agencies, and encourages industry to focus IR&D efforts on Air Force infrastructure and weapons system needs. The Air Force IR&D Program Office also matches industry R&D capabilities with Air Force requirements. The "matching" process involves searching the IR&D Database maintained by DTIC and other R&D and technology databases available online to identify industry capabilities to meet specific Air Force needs.

The Program Office doubled the number of IR&D search reports produced during 2001. Data-mining efforts ranged across a wide array of subjects from adaptive flight control to women pilots in the Air Force. A key effort involved support for the AF Dual-Use Program to identify

company sources and technical capabilities for each of the AF Dual-Use initiatives. As part of the data-mining effort, the Program Office conducts a quarterly review of major R&D databases and search engines to identify the best tools for its data-mining activities. These tools are noted on the AF IR&D website, http://www.afrl.af.mil/ird/, which is continually updated to provide easier access to IR&D/R&D information for AF organizations. The Program Office also provides support to DTIC by reviewing and correcting project data in the IR&D Database and by providing input to DTIC about outreach efforts to increase industry submissions to the IR&D Database.

The Program Office is also involved in other outreach efforts to industry to convey information about the AF IR&D Program and AF technological needs and to gain better information about IR&D activities. Such outreach efforts include:

- Helping contractors arrange Technical Interchange Meetings.
- Gathering information about industry R&D decisionmaking processes. For example, the AF IR&D Program has been working with the Department of Commerce to prepare a survey of industry to identify issues and motivations associated with commercial companies contributing information to a DoD R&D database.
- Participating in various industry forums. For example, the AF IR&D Office represents the Air Force on the Board of Advisors and the Research Committee of the Construction Industry Institute (CII).

The AF IR&D Program Office promotes awareness of IR&D activities and potential applications of IR&D accomplishments to AF needs throughout the Air Force. A meeting of AF organization IR&D focal points was held in July 2001 at the AF Research Laboratory Headquarters to discuss IR&D Program management issues. Improvements to the AF IR&D Program were discussed, the draft AF and AFRL IR&D Instructions were reviewed, and future actions were identified.

**5.3.2 Army IR&D Program** – The Army's strategic R&D planning efforts are closely tied to the Army's Transformation Campaign Plan and seek to provide technical solutions to transform the Army into a 21st century force that is strategically-responsive and dominant across the full spectrum of operations. The Army IR&D Program seeks to leverage industry IR&D efforts in pursuit of this goal and allow the Army to concentrate its R&D funds on efforts that complement industry activities.

The Army methodology for matching its R&D requirements to industry IR&D efforts emphasizes two-way communications with industry. The Army makes extensive use of formal Technical Interchange Meetings (TIMs), Advanced Planning Briefings for Industry (APBIs), various executive conferences, and other informal meetings with industry partners to discuss programs and technical objectives and provide mutual feedback in an effort to leverage industry IR&D investments to meet Army needs. In FY01, the Army held 20 formal TIMs and approximately 20 APBIs. Executive conferences included the Association of the US Army Conferences, participation in the Atlanta Conference series, and meetings between the Commanding General of the Army Materiel Command (AMC) and CEOs of private sector companies. Army laboratories and Research, Development & Engineering Centers also

participate in numerous consortia with industry and have substantial involvement with both the automotive and rotorcraft industries.

The Army maintains a broad Internet presence for sharing planning and requirements documents with industry. Many Army organizations issue Broad Agency Announcements on the Internet, highlighting their R&D plans and requirements. The Army Science and Technology Master Plan (ASTMP), which describes key funded science and technology programs, is also available via the Internet (http://www.saalt.army.mil/sard-zt/ASTMP98/astmp98.htm). The ASTMP is a reference document for senior leaders, scientists, and soldiers and an information compendium for industry and academia. Army Pamphlet 525-66, "Future Operational Capability," as well as other operational and requirements documents, are available on the Army Training and Doctrine Command website (http://www.tradoc.army.mil/). Information on upcoming APBIs and the Army Potential Contractor Program (APCP) is available online from the AMC Technical and Industrial Liaison Office (http://www.amc.army.mil/amc/rda/tilomenu.html). The APCP certifies and registers non-government organizations for access to controlled scientific and technical information including information on Army needs, requirements, programs, funding and advanced planning associated with research, development, and acquisition. Over the course of FY01, the Army has also updated its IR&D website at http://www.arl.army.mil/tto/ird/ to include new program information and current points of contact at the various Army labs and centers. Additionally, Army labs and centers maintain their own local websites, and numerous other Army websites exist that contain an array of information for sharing technology needs and identifying business opportunities.

During FY01, the Army began the process of revising AR 70-74, the Army IR&D regulation, to be consistent with current law and DoD policy. The final draft version of this regulation is currently in the Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology) for formal coordination and approval. Finally, the Army has developed a training strategy and identified training points of contact in its field activities to highlight the IR&D program and provide programmatic information to its science and engineering workforce.

**5.3.3 Navy IR&D Program** – The Navy IR&D Program promotes communications with contractors to ensure that contractor IR&D and Navy-funded R&D complement each other in support of Navy technological needs. Navy IR&D Program coordinators also promote awareness of and access to IR&D project information within their organizations, to avoid duplication of IR&D efforts by Navy-funded R&D and to expedite the transition of IR&D-based technologies into Naval systems.

Navy R&D planning and requirements information is available to qualified current and potential DoD contractors through the Navy Acquisition, Research and Development Information Center (NARDIC). NARDIC utilizes a number of methods to keep industry informed: A homepage at http://nardic.onr.navy.mil, consisting of approximately 1500 links; technical information and guidance to its users to help locate information; and an e-mail newsletter sent to approximately 500 registered contractors notifying them of new information available in the office as well as on the NARDIC homepage. Reference services databases are maintained and made available to the contractor community. Meetings are conducted by NARDIC with current and potential contractors to disseminate information on the Navy Research, Development, Testing and

Evaluation (RDT&E) organization, mission, requirements and procurement procedures. NARDIC maintains its office at the Office of Naval Research in Arlington, VA.

During FY01, Navy IR&D Program coordinators played an increasingly active role in facilitating technical interchange meetings between the Navy and industry. In these meetings, contractors brief their IR&D activities to Navy representatives and receive feedback about how these activities might coincide with the Navy's technological needs.

Major Navy/industry technical conferences and expositions were held during FY01 to provide industry with information about Navy R&D and acquisition programs. The Second Annual Naval-Industry Research and Development Partnership Conference was held in August 2001, and Joint Undersea Warfare Technology Conferences were held in both the spring and the fall. The R&D Partnership Conference addressed such topics as emerging technologies, Naval Research outreach to industry, and rapid insertion of new technologies into Naval systems. The Undersea Warfare Technology Conferences focused on the technological needs of Navy programs and facilitated contacts between high-level Navy representatives and researchers in industry, academia, and Government. The Naval Aviation Science & Technology Office (NAVSTO) of Naval Air Systems Command hosted a Northrop Grumman technology exposition and exchange in April 2001. This exposition addressed network centric warfare, airborne surveillance technology insertion, unmanned systems concept development and demonstration, and electronic warfare and tactical systems technology insertion.

The Navy's use of electronic media, including the homepage maintained by NARDIC, has improved access to information about its technological needs. The Naval Sea Systems Command Corporate FY01 Research & Development Needs document is available to industry on compact disk in both restricted and unrestricted versions. A number of Navy websites provide information about Navy technological needs and Navy R&D activities, and additional Web-based capabilities of this type were developed during FY01. For example, the Chief Technology Office (CTO) for the Space & Naval Warfare Systems Command (SPAWAR) implemented a web-based Technology Information Exchange site during the past year. This site provides information about IR&D accomplishments and other new technologies of potential interest for SPAWAR applications, helps focus CTO efforts to identify technologies of potential interest, and promotes faster transition of new technologies to SPAWAR needs.

Another means to provide industry access to information about Navy technological needs is the Naval Potential Contractor Program (NPCP). Forms, materials, and internal operating instructions for this program were updated and made available via the Internet during FY01 at http://nardic.onr.navy.mil. The NPCP provides an approved means for the interchange of controlled information between DoD activities and researchers from qualified firms, universities, and other non-government organizations. Through the NPCP, access is allowed to documents at NARDIC. Information is also available from other Naval and defense activities. This program is designed for both potential contractors and current DoD contractors seeking information in areas not covered by current contracts. Specifically, the NPCP provides access to classified and unclassified scientific and technical information concerning Naval needs, requirements, programs, accomplishments, advanced planning, and funding associated with RDT&E.

## Appendix A – IR&D Law

**Section 802 of Public Law (10 USC § 2372)**
Sec. 2372. Independent research and development and bid and proposal costs: payments to contractors

(a) Regulations. - The Secretary of Defense shall prescribe regulations governing the payment, by the Department of Defense, of expenses incurred by contractors for independent research and development and bid and proposal costs.
(b) Costs Allowable as Indirect Expenses. - The regulations prescribed pursuant to subsection (a) shall provide that independent research and development and bid and proposal costs shall be allowable as indirect expenses on covered contracts to the extent that those costs are allocable, reasonable, and not otherwise unallowable by law or under the Federal Acquisition Regulation.
(c) Additional Controls. - Subject to subsection (f), the regulations prescribed pursuant to subsection (a) may include the following provisions:
(1) A limitation on the allowability of independent research and development and bid and proposal costs to work which the Secretary of Defense determines is of potential interest to the Department of Defense.
(2) For each of fiscal years 1993 through 1995, a limitation in the case of major contractors that the total amount of the independent research and development and bid and proposal costs that are allowable as expenses of the contractor's covered segments may not exceed the contractor's adjusted maximum reimbursement amount.
(3) Implementation of regular methods for transmission--
(A) from the Department of Defense to contractors, in a reasonable manner, of timely and comprehensive information regarding planned or expected Department of Defense future needs; and
(B) from contractors to the Department of Defense, in a reasonable manner, of information regarding progress by the contractor on the contractor's independent research and development programs.
(d) Adjusted Maximum Reimbursement Amount. - For purposes of subsection (c)(2), the adjusted maximum reimbursement amount for a major contractor for a fiscal year is the sum of--
(1) the total amount of the allowable independent research and development and bid and proposal costs incurred by the contractor during the preceding fiscal year;
(2) 5 percent of the amount referred to in paragraph (1); and
(3) if the projected total amount of the independent research and development and bid and proposal costs incurred by the contractor for such fiscal year is greater than the total amount of the independent research and development and bid and proposal costs incurred by the contractor for the preceding fiscal year, the amount that is determined by multiplying the amount referred to in paragraph (1) by the lesser of--
(A) the percentage by which the projected total amount of such incurred costs for such fiscal year exceeds the total amount of the incurred costs of the contractor for the preceding fiscal year; or
(B) the estimated percentage rate of inflation from the end of the preceding fiscal year to the end of the fiscal year for which the amount of the limitation is being computed.
(e) Waiver of Adjusted Maximum Reimbursement Amount. - The Secretary of Defense may waive the applicability of any limitation prescribed under subsection (c)(2) to any contractor for

a fiscal year to the extent that the Secretary determines that allowing the contractor to exceed the contractor's adjusted maximum reimbursement amount for such year--
(1) is necessary to reimburse such contractor at least to the extent that would have been allowed under regulations as in effect on the day before the date of the enactment of the National Defense Authorization Act for Fiscal Years 1992 and 1993; or
(2) is otherwise in the best interest of the Government.
(f) Limitations on Regulations. - Regulations prescribed pursuant to subsection (c) may not include provisions that would infringe on the independence of a contractor to choose which technologies to pursue in its independent research and development program.
(g) Encouragement of Certain Contractor Activities. - The regulations under subsection (a) shall encourage contractors to engage in research and development activities of potential interest to the Department of Defense, including activities intended to accomplish any of the following:
(1) Enabling superior performance of future United States weapon systems and components.
(2) Reducing acquisition costs and life-cycle costs of military systems.
(3) Strengthening the defense industrial base and the technology base of the United States.
(4) Enhancing the industrial competitiveness of the United States.
(5) Promoting the development of technologies identified as critical under section 2522 of this title.
(6) Increasing the development and promotion of efficient and effective applications of dual-use technologies.
(7) Providing efficient and effective technologies for achieving such environmental benefits as improved environmental data gathering, environmental cleanup and restoration, pollution reduction in manufacturing, environmental conservation, and environmentally safe management of facilities.
(h) Major Contractors. - A contractor shall be considered to be a major contractor for the purposes of subsection (c) for any fiscal year if for the preceding fiscal year the contractor's covered segments allocated to Department of Defense contracts a total of more than $10,000,000 in independent research and development and bid and proposal costs.
(i) Definitions. - In this section:
(1) Covered contract. - The term 'covered contract' has the meaning given that term in section 2324(m) of this title.
(2) Covered segment. - The term 'covered segment,' with respect to a contractor, means a product division of the contractor that allocated more than $1,000,000 in independent research and development and bid and proposal costs to Department of Defense contracts during the preceding fiscal year. In the case of a contractor that has no product divisions, such term means the contractor as a whole.

# Appendix B – DoD IR&D Directive

# Appendix C – IR&D Brochure for Industry

# Appendix D – IR&D Brochure for DoD Personnel

## Endnotes

[1] The DoD IR&D Program Action Plan was approved by the Deputy Under Secretary of Defense (S&T) in November 2000.

[2] The Federal Acquisition Regulation (FAR) (subpart 31.205-18, 9 Feb 1988) defines IR&D as: "A contractor's IR&D cost that consists of projects falling within the four following areas: (1) basic research, (2) applied research, (3) development, and (4) systems and other concept formulation studies. The term does not include the costs of effort sponsored by a grant or required in the performance of a contract. IR&D effort shall not include technical effort expended in developing and preparing technical data specifically to support submitting a bid or proposal."

[3] The Defense Contract Audit Agency (DCAA) reports annually on IR&D costs allocated to defense contracts by major contractors. DCAA uses two definitions of "major contractor" – the Defense FAR Supplement (DFARS) definition and a DCAA definition. The DFARS (subparts 231.205-18, 23 Feb 1999 and 242.771, 23 Feb 1999) definition is:

> "Major contractor means any contractor whose covered segments allocated a total of more than $11 million in IR&D/B&P costs to covered contracts during the preceding year. For purposes of calculating the dollar threshold amounts to determine whether a contractor meets the definition of "major contractor," do not include contractor segments allocating less than $1.1 million of IR&D/B&P costs to covered contracts during the preceding fiscal year."

The DCAA definition is:

> "In 1998 any contractor that had $70 million or more in annual auditable costs for the prior fiscal year or in 1999 any contractor that had $80 million or more in annual auditable costs for the prior fiscal year."

The DCAA data do not cover IR&D spending by (1) business segments of major contractors that do not exceed the dollar threshold for IR&D spending in the first definition; (2) contractors whose IR&D spending or auditable costs fall below the dollar thresholds in either definition; and (3) companies that generally incur nominal or no IR&D costs, including construction companies, educational institutions, foreign contractors and overseas operations of U.S. companies, insurance companies, marine transport contractors, and military medical contractors.

[4] See Web sites sponsored by various DoD organizations for further information – e.g., the DoD IR&D Program site at http://www.dtic.mil/ird/; the Air Force IR&D Program site at http://www.afrl.af.mil/ird/; the Army Training and Doctrine Command site at http://www-tradoc.army.mil/; and the Navy Acquisition, Research & Development Information Center (NARDIC) at http://nardic.nrl.navy.mil/.

[5] For a complete list of responsibilities of each DoD organization, see section 6 of DoD Directive 3204.1 in Appendix B.

[6] "Covered" contracts are defense contracts subject to defense cost accounting standards. Covered contracts include DoD prime contracts for amounts exceeding the simplified acquisition threshold, except for fixed-price contracts without cost incentives, and subcontracts for amounts exceeding the simplified acquisition threshold, except for fixed-price subcontracts without cost incentives under such prime contracts. "Simplified acquisition threshold" means $100,000, except that in the case of any contract to be awarded and performed, or purchase to be made, outside the United States in support of a contingency operation or a humanitarian or peacekeeping operation, the term means $200,000.